Docket: ESID-1604-X

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	:	
THUNDAT, T. et al.	:	Art Unit: 2878
Serial No.: 08/588,484	:	Examiner: HANIG, R.
Filed: January 18, 1996	:	
For: ELECTROMAGNETIC AND NUCLEAR RADIATION DETECTOR USING MICROMECHANICAL SENSORS	:	

DECLARATION UNDER 37 CFR §1.132

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

I, Robert J. Warmack, do hereby make the following statement under oath:

(1) I am a co-inventor of the above-identified application.

(2) I received a Bachelor of Science degree in Engineering Physics from the University of Tennessee, Knoxville, Tennessee in 1970.

(3) I received the degree of Doctor of Philosophy in Physics from the University of Tennessee, Knoxville, Tennessee in 1975.

(4) I have been employed as a physicist continuously from 1978 to the present at the Oak Ridge National Laboratory, Oak Ridge, Tennessee.

(5) I was employed as a Research Staff Member in the

Analytical Chemistry Division, Mass Spectrometry Section of the Oak Ridge National Laboratory from 1978 to 1981.

(6) I was employed as a Staff Member in the Health and Safety Research Division, Liquid and Submicron Physics Group, Biological and Radiation Physics Section of the Oak Ridge National Laboratory from 1981 to 1993.

(7) At the Health and Safety Research Division I investigated optical and charged particle interaction with submicron particles and thin films.

(8) I have been employed as a Group Leader of the Molecular Imaging Group in the Oak Ridge National Laboratory from 1993 to the present.

(9) I was an instructor in the Mathematics Department and then a research assistant in the Physics Department at the University of Tennessee, Knoxville, Tennessee from June 1969 to June 1973.

(10) I was a consultant at the Oak Ridge National Laboratory, Health Physics Division, Oak Ridge, Tennessee from June 1973 to December 1975.

(11) As a consultant I investigated optical reflectivity and electrical conductivity, and studied organic solids.

(12) I was a Postdoctoral Research Associate in the Chemistry Department of the University of Tennessee, Knoxville, Tennessee from December 1975 to March 1978.

(13) I have been a part-time faculty member of the Department of Physics and Astronomy of the University of Tennessee, Knoxville, Tennessee from February 1983 to the present.

(14) I am a member of the American Physical Society as a Fellow.

(15) I have published over one hundred forty open-literature publications on subjects including organic semiconductors, charge exchange reactions in crossed molecular beams, mass spectrometry, submicron physics, scanning probe microscopy and sensor physics.

CLAIMED INVENTION NOT OBVIOUS

(16) I have read and am familiar with, the specification and claims of the above-identified application.

(17) I have read the article by Barnes et al. in *Nature*, vol. 372, 3 November 1994 ("the Barnes paper") cited by the Examiner.

(18) The Barnes paper is directed to measuring photothermal properties of materials attached to a cantilever.

(19) The use of radiation in the Barnes paper is incidental to the goal of measuring the photothermal properties of the materials attached to the cantilever.

(20) At the time of the invention claimed in the above-identified application, the Barnes paper would not have been

relevant to one of ordinary skill in the art of detecting radiation.

(21) One of ordinary skill in the art of radiation detection would not look to the field of the Barnes paper for guidance in solving problems related to radiation detection.

HALSOR DETECTS CURRENT BETWEEN SOURCE AND DRAIN REGIONS

(22) I have read U.S. Patent No. 3,896,309 to Halsor et al. ("the Halsor '309 patent") cited by the Examiner.

(23) The Halsor '309 patent describes a complex process of making a field effect transistor (FET) and micromachining a bimaterial cantilever member.

(24) The cantilever member is a gate electrode in the field effect transistor (FET) arrangement of the Halsor '309 patent.

(25) The cantilever member in this arrangement is a metal, conducting electrode in addition to being bimaterial.

(26) The bending of the cantilever member induces a charge underneath the gate electrode which causes a change in current from source to drain in the field effect transistor (FET).

(27) The changing current from source to drain is monitored in the Halsor '309 patent.

(28) There is no explicit mention of optical absorption, or of coating the cantilever member to promote optical absorption, in the Halsor '309 patent.

BARKER NOT RELATED TO RADIATION DETECTION

(29) I have read U.S. Patent No. 3,415,712 to Barker ("the Barker '712 patent") cited by the Examiner.

(30) The Barker '712 patent describes a device in which a change in capacitance occurs in response to a change in temperature.

(31) In Fig. 5 of the Barker '712 patent the capacitance between electrode 42 and bimaterial strip 43 will increase with an increase in temperature.

(32) The device described in the Barker '712 patent is useful for detecting a change in temperature, not radiation.

(33) At the time of the invention claimed in the above-identified application, the Barker '712 patent would not have been relevant to one of ordinary skill in the art of detecting radiation.

(34) One of ordinary skill in the art of radiation detection would not look to the field of the Barker '712 patent for guidance in solving problems related to radiation detection.

BURNS NOT RELATED TO RADIATION DETECTION

(35) I have read U.S. Patent No. 5,550,516 to Burns et al. ("the Burns '516 patent") cited by the Examiner.

(36) The Burns '516 patent does not discuss radiation detection.

(37) Column 1, lines 50-54 of the Burns '516 patent state that "The present structure makes it possible to take advantage of the greater-than-unity gain to realize a resonant strain transducer which can be augmented by an appropriate microstructure to measure pressure, acceleration, force and other applied stimuli."

(38) Column 2, lines 41-44 of the Burns '516 patent state that "Depending on the design of the microstructure formed monolithically with the microbeam, the induced strain can be caused by and not limited to pressure, acceleration, temperature, air flow or humidity."

(39) One of ordinary skill in the art of radiation detection would not interpret the words at column 1, lines 50-54 and column 2, lines 41-44 of the Burns '516 patent as pertaining to detection of radiation.

(40) At the time of the invention claimed in the above-identified application, the Burns '516 patent would not have been relevant to one of ordinary skill in the art of detecting radiation.

(41) One of ordinary skill in the art of radiation detection would not look to the field of the Burns '516 patent for guidance in solving problems related to radiation detection.

UNEXPECTED RESULTS

(42) During the course of laboratory experimentation the co-inventors and I made the radiation detector claimed in the above-identified application.

(43) The co-inventors and I fabricated microcantilevers from materials that respond to impinging radiation which causes a change in mechanical properties of the microcantilever.

(44) I saw that the detector was capable of detecting electromagnetic and nuclear radiation with high sensitivity.

(45) I saw that the detector exhibited relatively fast response times.

(46) I determined that under certain circumstances the change in mechanical properties of the microcantilever is the result of radiation effects in the microcantilever or in an applied coating on the microcantilever.

(47) I was surprised by these unexpected results.

(48) These unexpected results are attributable to the differences between the invention claimed in the above-identified application and the structure described in the Barnes paper, the Halsor '309 patent, the Barker '712 patent and the Burns '516 patent.

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated: May 26, 1998

Robert J. Warmack